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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/889,697	10/19/2001	Thomas Sporer	SCHO0057	8669

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EXAMINER	
FLANDERS, ANDREW C	

ART UNIT	PAPER NUMBER
2644	

DATE MAILED: 06/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/889,697	SPORER ET AL.	
	Examiner	Art Unit	
	Andrew C. Flanders	2644	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 October 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12 and 14-19* is/are rejected.

7)☒ Claim(s) *13,20 and 21* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 October 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 4 and 17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding Claim 4, Claim 4 recites the limitation "the head-related transfer function" in line 1 on page 14. There is insufficient antecedent basis for this limitation in the claim.

Regarding Claim 17, it is unclear to the examiner how the reference points could be ears of a human listener. It appears from the claim language that the reference points receive a signal and then proceed to process it. The examiner is unsure how this is possible with human ears. Examiner respectfully requests clarification.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. **Claims 1, 2, 4, 7, 8, 12, 14 – 16, 18 and 19** are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki (EP 0 165 733) in view of Seitzer (WO 98/23130) (of which U.S. 6,271,771 is used for a translation and referenced herein).

Regarding **Claim 1**, Suzuki discloses a system for evaluating the quality of an audio signal comprising a plurality of channels, each channel being adapted to be made audible by one loudspeaker of a plurality of loudspeakers which are positioned at different positions in at least fictitious room, and the two listening reference points being defined with respect to the positions of the plurality of loudspeakers (i.e. a method and apparatus for measuring and correcting acoustic characteristic in sound field; title; and 4 loud speakers are arranged in a room for reproducing multiple channels of sound, in which two microphones are placed on a dummy's head; see figure 9 and pages 17 – 21), said system comprising:

a unit for converting the audio signals at a first reference point and into a first audio sum signal (i.e. the output signals of the microphones are subjected to addition by an adder; page 19);

and into a second audio sum signal at the second reference point (i.e. the output signals of the microphones are subjected to addition by an adder; page 19);

the audio sum signals at the first and second reference points being a superposition of the respective channels (i.e. the speakers can be operated

simultaneously; page 18; and plural sound sources can be collectively evaluated by this method);

weighted with a respective transfer function between the respective loudspeaker and the reference point in question (i.e. the sound field can be expressed by a single transmission function; page 19).

Suzuki does not disclose evaluating the audio signal by evaluating the quality of an audio test signal derived from an audio reference signal by coding and decoding, converting the audio reference signal into an audio reference sum signal at the first reference point, converting a second audio reference sum signal at the second reference point, and converting the audio test signal into a first audio test sum signal at the first reference point and into a second audio test sum signal at the second reference point, or a unit for evaluating the quality of the audio test sum signals while taking into consideration the audio reference sum signals so as to provide an indication of the quality of the audio test signal.

Seitzer discloses:

evaluating the quality of an audio test signal derived from an audio reference signal by coding and decoding (abstract).

The combination of Seitzer and Suzuki teaches:

converting the audio reference signal into an audio reference sum signal at the first reference point, converting a second audio reference sum signal at the second reference point (i.e. using Suzuki's two microphones to process Seitzer's audio reference signal);

and converting the audio test signal into a first audio test sum signal at the first reference point and into a second audio test sum signal at the second reference point (i.e. using Suzuki's two microphones to process Seitzer's audio test signal); and

a unit for evaluating the quality of the audio test sum signals while taking into consideration the audio reference sum signals so as to provide an indication of the quality of the audio test signal (i.e. using Seitzer's evaluation apparatus, Fig 4., as Suzuki's evaluation method after summing the respective test and reference signals. Seitzer's evaluation apparatus in figure 4 contains an evaluation means that evaluates differences between the audio reference signal and the audio test signal; col. 9 lines 20 - 32).

It would have been obvious to one of ordinary skill in the art at the time of the invention to apply Seitzer's teaching of evaluation a test and a reference signal to Suzuki's apparatus for measuring an acoustic characteristic in a sound field in order to measure the quality of a coded signal. One would have been motivated to do so in order to determine whether audible artificial products or artifacts, which aren't a problem in analog signals, have been added during coding; see Seitzer col. 1 lines 25 – 30.

Regarding **Claim 2**, in addition to the elements stated above regarding claim 1, the Seitzer/Suzuki combination further discloses:

wherein the transfer functions between the respective loudspeakers and the respective reference points are individual head-related transfer functions so

as to take into account the different impulse responses for difference sound incidence directions into the human ear (i.e. there is an acoustic transmission characteristic between the listening point and the sound sources; Suzuki p. 19; and a filter bank with the transfer characteristics of the human ear; Seitzer abstract and Fig. 4).

Regarding **Claim 4**, in addition to the elements stated above regarding claim 1, Suzuki further discloses:

wherein the transfer function between the respective loudspeaker and the respective reference point is a transfer function which corresponds to the convolution of the head-related transfer function with a room impulse response in such a way that the sound reflections of the room in which the plurality of loudspeakers and the two reference points are positioned are taken into account (i.e. the acoustic transmission characteristic between the listening point and the sound source is measured; page 19; and since the characteristic is measured according to the sum of the output signals of the microphones at the ears of the dummy head, the measurement result is a composite one including the directivity of the ears; page 21).

Regarding **Claim 5**, in addition to the elements stated above regarding claim 1, Suzuki further discloses:

wherein the transfer functions between the respective loudspeakers and the respective reference points are averaged transfer functions which are the

result of averaging individual transfer functions between fixed loud speaker positions (i.e. the received sound output characteristic is obtained by averaging the output of the adder and the transmission characteristic is calculated using this; page 19).

Suzuki does not disclose varying positions of the reference points. However, it would have been obvious to one of ordinary skill in the art at the time of the invention to move the location of the dummy head to get readings throughout the room. One would have been motivated to do so in order to get readings for situations where there are multiple listeners.

Regarding **Claim 7**, in addition to the elements stated above regarding claim 1, Suzuki discloses:

wherein the room is a standardized reference listening room and wherein the two reference points simulate the auditory organs of a test person at a reference listening position (See Fig 9, showing a room with a dummy head with simulated ears).

Regarding **Claim 8**, in addition to the elements stated above regarding claim 1, Suzuki discloses:

Wherein the room is a sound studio and wherein the two reference points simulate the auditory organs of a test person at an arbitrary seated/standing position in said room (See Fig 9, showing a room with a dummy head with simulated ears).

Regarding **Claim 12**, in addition to the elements stated above regarding claim 5, Seitzer discloses:

wherein the audio test signal is a stereo signal (col. 16 lines 17 – 23).

Regarding **Claim 14**, , Suzuki discloses a method for evaluating the quality of an audio signal comprising a plurality of channels, each channel being adapted to be made audible by one loudspeaker of a plurality of loudspeakers which are positioned at different positions in at least fictitious room, and the two listening reference points being defined with respect to the positions of the plurality of loudspeakers (i.e. a method and apparatus for measuring and correcting acoustic characteristic in sound field; title; and 4 loud speakers are arranged in a room for reproducing multiple channels of sound, in which two microphones are placed on a dummy's head; see figure 9 and pages 17 – 21), said method comprising the following steps:

converting the audio signal into a first audio um signal at a first reference point (i.e. the output signals of the microphones are subjected to addition by an adder; page 19);

and into a second audio sum signal at the second reference point (i.e. the output signals of the microphones are subjected to addition by an adder; page 19);

weighting the respective channels, which can be emitted by said plurality of loudspeakers, with a respective transfer function between the respective

loudspeaker and the reference point in question (i.e. the sound field can be expressed by a single transmission function; page 19).

superimposing the weighted channels at said first and second reference point so as to obtain the audio reference sum signals and the audio test sum signals (i.e. the speakers can be operated simultaneously; page 18; and plural sound sources can be collectively evaluated by this method).

Suzuki does not disclose evaluating the audio signal by evaluating the quality of an audio test signal derived from an audio reference signal by coding and decoding, converting the audio reference signal into an audio reference sum signal at the first reference point, converting a second audio reference sum signal at the second reference point, and converting the audio test signal into a first audio test sum signal at the first reference point and into a second audio test sum signal at the second reference point, conducting the audio test sum signals and the audio reference sum signals to a unit for evaluating the quality of the audio test sum signals while taking into consideration the audio reference sum signals so as to provide an indication of the quality of the audio test signal.

Seitzer discloses:

evaluating the quality of an audio test signal derived from an audio reference signal by coding and decoding (abstract).

The combination of Seitzer and Suzuki teaches:

converting the audio reference signal into an audio reference sum signal at the first reference point, converting a second audio reference sum signal at the

second reference point (i.e. using Suzuki's two microphones to process Seitzer's audio reference signal);

and converting the audio test signal into a first audio test sum signal at the first reference point and into a second audio test sum signal at the second reference point (i.e. using Suzuki's two microphones to process Seitzer's audio test signal); and

conducting the audio test sum signals and the audio reference sum signals to a unit for evaluating the quality of the audio test sum signals while taking into consideration the audio reference sum signals so as to provide an indication of the quality of the audio test signal (i.e. using Seitzer's evaluation apparatus, Fig 4., as Suzuki's evaluation method after summing the respective test and reference signals. Seitzer's evaluation apparatus in figure 4 contains an evaluation means that evaluates differences between the audio reference signal and the audio test signal; col. 9 lines 20 - 32).

It would have been obvious to one of ordinary skill in the art at the time of the invention to apply Seitzer's teaching of evaluation a test and a reference signal to Suzuki's apparatus for measuring an acoustic characteristic in a sound field in order to measure the quality of a coded signal. One would have been motivated to do so in order to determine whether audible artificial products or artifacts, which aren't a problem in analog signals, have been added during coding; see Seitzer col. 1 lines 25 – 30.

Regarding **Claim 15**, in addition to the elements stated above regarding claim 14, Suzuki further discloses:

obtaining the individual transfer functions between each loudspeaker and each reference point (i.e. the transmission characteristic is calculated from determining the difference between the received sound output characteristic and the transmission characteristic; of which, the sound output characteristic is obtained from the output of the adder which receives it input from the two microphones; page 19).

Regarding **Claim 16**, in addition to the elements stated above regarding claim 15, Suzuki further discloses:

exciting a loudspeaker with an excitation signal (i.e. it is inherent that the speakers shown in Fig. 9 must be excited in order for the device to operate);

measuring the signal at each reference point (i.e. the signal is measured at the microphones shown in fig 9);

determining the transfer function between the excited loudspeaker and the first reference point (i.e. the transmission characteristic is calculated from determining the difference between the received sound output characteristic and the transmission characteristic; of which, the sound output characteristic is obtained from the output of the adder which receives it input from the two microphones; page 19);

determining the transfer function between the excited loudspeaker and the second reference point (i.e. the transmission characteristic is calculated from

determining the difference between the received sound output characteristic and the transmission characteristic; of which, the sound output characteristic is obtained from the output of the adder which receives it input from the two microphones; page 19); and

repeating the steps of exciting, measuring and determining until all the loudspeakers have been excited so as to obtain the individual transfer functions (i.e. the speakers can be operated individually or at the same time; page 18 and 19).

Regarding **Claim 18**, in addition to the to the in addition to the elements stated above regarding claim 16, Suzuki further discloses:

wherein the first and second reference points are build in microphones of an artificial head (Fig. 9).

Regarding **Claim 19**, in addition to the elements stated above regarding claim 16, Suzuki further discloses:

wherein the excitation signal is pseudo-noise signal (Fig. 9, noise generators drive the speakers).

3. **Claims 3 and 17** are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki (EP 0 165 733) in view of Seitzer (WO 98/23130) (of which U.S. 6,271,771 is used for a translation and referenced herein) and in further view of Moller (U.S. Patent 6,118,875).

Regarding **Claim 3**, in addition to the elements stated above regarding claim 1, the combination of Suzuki in view of Seitzer fails to disclose wherein the transfer functions between the respective loudspeakers and the respective reference points are mean head-related transfer functions obtained by averaging a large number of individuals.

Moller discloses:

Wherein the transfer functions between the respective loudspeakers and the respective reference points are mean head-related transfer functions obtained by averaging a large number of individuals (i.e. Figs 13 and 14 and they're related text teach of averaging a group of HRTF's for a large number of individuals).

It would have been obvious to one of ordinary skill in the art at the time of the invention to add Moller's averaging technique to the combination of Suzuki in view of Seitzer. One would have been motivated to do so because it is desirable in the art to be able to simulate a huge number of HTFs for averaging purposes, see Moller col. 25 lines 33 – 43.

Regarding **Claim 17**, in addition to the elements stated above regarding claim 16, the combination of Suzuki in view of Seitzer does not explicitly disclose wherein the first and second reference points are the ears of a human listener.

Moller discloses:

wherein the first and second reference points are the ears of a human listener (Figs. 4, 5 and 6).

It would have been obvious to one of ordinary skill in the art at the time of the invention to add Moller's averaging technique to the combination of Suzuki in view of Seitzer. One would have been motivated to do so because it is desirable in the art to be able to simulate a huge number of HTFs for averaging purposes, see Moller col. 25 lines 33 – 43.

4. **Claims 5, 6, 9, 10 and 11** are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki (EP 0 165 733) in view of Seitzer (WO 98/23130) (of which U.S. 6,271,771 is used for a translation and referenced herein) and in further view of Moller (U.S. Patent 6,118,875) and in further view of Brungart (U.S. Patent 6,223,090).

Regarding **Claim 5**, in addition to the elements stated above regarding claim 1, Suzuki further discloses:

wherein the transfer functions between the respective loudspeakers and the respective reference points are averaged transfer functions which are the result of averaging individual transfer functions between fixed loud speaker positions (i.e. the received sound output characteristic is obtained by averaging the output of the adder and the transmission characteristic is calculated using this; page 19).

Suzuki does not disclose varying positions of the reference points.

Brungart discloses varying positions of the reference point (i.e. the invention accurately positions in azimuth, roll and pitch of the head of a manikin situated on a motorized rotatable stand relative to a stationary sound source during HRTF measuring; col. 3 lines 66 – 67 and col. 4 lines 1 – 7).

It would have been obvious to one of ordinary skill in the art at the time of the invention to apply the teachings of moving the dummy as taught by Brungart to the combination of Suzuki in view of Seitzer. One would have been motivated to do so in order to get accurate near field HRTF measuring; see Brungart col. 2 lines 55 – 58.

Regarding **Claim 6**, in addition to the elements stated above regarding claim 1, the combination of Suzuki in view of Seitzer does not explicitly disclose the limitation of claim 6.

Brungart wherein said conversion unit is arranged for providing transfer functions for various positions of said first and second reference points with respect to fixed loud speaker positions (i.e. the invention accurately positions in azimuth, roll and pitch of the head of a manikin situated on a motorized rotatable stand relative to a stationary sound source during HRTF measuring; col. 3 lines 66 – 67 and col. 4 lines 1 – 7).

Thus the combination also teaches:

wherein the quality evaluating unit is arranged for providing the indication of the quality of the audio test signal for various transfer functions and for providing the positions of the reference points for the indication of the poorest

quality (i.e. the testing of various locations would provide various transfer functions).

It would have been obvious to one of ordinary skill in the art at the time of the invention to apply the teachings of moving the dummy as taught by Brungart to the combination of Suzuki in view of Seitzer. One would have been motivated to do so in order to get accurate near field HRTF measuring; see Brungart col. 2 lines 55 – 58.

Regarding **Claim 9**, in addition to the elements stated above regarding claim 5, the combination discloses wherein the different positions of the first and second reference points deviate only slightly from a reference point so as to simulate a bearing movement of a test person (i.e. the invention accurately positions in azimuth, roll and pitch of the head of a manikin situated on a motorized rotatable stand relative to a stationary sound source during HRTF measuring; col. 3 lines 66 – 67 and col. 4 lines 1 – 7).

Regarding **Claim 10**, in addition to the elements stated above regarding claim 5, the combination discloses wherein the different positions of the first and second reference points deviate only slightly from a reference point so as to simulate a rotation of the head of a test listener (i.e. the invention accurately positions in azimuth, roll and pitch of the head of a manikin situated on a motorized rotatable stand relative to a stationary sound source during HRTF measuring; col. 3 lines 66 – 67 and col. 4 lines 1 – 7).

Regarding **Claim 11**, in addition to the elements stated above regarding claim 5, Suzuki discloses a room with 4 speakers. Suzuki does not disclose wherein the audio test signal comprises five channels, said five channels being a left rear, a right rear, a left front, a right front and a middle front channel.

However, it would have been obvious to one of ordinary skill in the art at the time of the invention to add speakers to the system. Speaker systems with 5 channels of surround sound were well known at the time of the invention and it would be desirable to apply the teachings of the Suzuki reference to a system with greater or fewer speakers to allow any users of multiple speaker systems the ability to use the apparatus.

Allowable Subject Matter

Claims 13, 20 and 21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Zacharov (U.S. 6,639,989) and Dunlavy (U.S. 5,778,087).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew C. Flanders whose telephone number is (571) 272-7516. The examiner can normally be reached on M-F 8:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh Tran can be reached on (571) 272-7564. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SINH TRAN
SUPERVISORY PATENT EXAMINER

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